IBM Tealeaf CX Mobile
Version 9 Release 0
June 12, 2014

Tealeaf CX Mobile User Manual

Note
Before using this information and the product it supports, read the information in "Notices" on page 47.

This edition applies to version 9, release 0, modification 0 of IBM Tealeaf CX Mobile and to all subsequent releases and modifications until otherwise indicated in new editions.

© Copyright IBM Corporation 1999, 2014.
US Government Users Restricted Rights – Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

Contents

Tealeaf CX Mobile User Manual v

Chapter 1. Overview of CX Mobile . . . 1
Differences in the Mobile Experience 1
Benefits 2
Key Features of Tealeaf CX Mobile 2
Available Mobile Data by License 3
Getting Started with Tealeaf CX Mobile 7
Enabling CX Mobile 7
Acquire License Key 7
Acquire Latest `BrowsCap.csv` 8
Acquire Latest `WURFL` 8
Convert the latest WURFL data to Tealeaf format 8
Import the Mobile Dashboards 8
Update the Event Values Lists with the latest User Agent data 8
Instrumenting CX Mobile for Mobile App 8

Chapter 2. Search and Replay for Mobile Web 11
Identifying Mobile Web Sessions from Mobile Devices 11
Search 12
Portal Search 12
Replay 14
Mobile Replay overview 14
Limitations in Replay of Mobile Visitors 14
BBR configuration 15
BBR replay screen 16
Screen Dimensions for Mobile Devices 19
User interface events from mobile browsers in BBR 19
Troubleshooting 19
Traffic Type is not populated 19
UI Events not displayed in replay 20

Chapter 3. Search and Replay for Mobile Apps 21
Before You Begin 21
Identifying Mobile App Sessions 21
Mobile-Related Event Objects Provided by Tealeaf 22
Search 23
Portal Search 23
Replay of Mobile App Sessions through HTML representation 26
Limitations 27
Replay of Mobile App Sessions through Screen Captures 28
Limitations 28
Browser-specific features in BBR replay 28
Screen Dimensions for Mobile Devices 29
Browser Based Replay Session Replay 30

Chapter 4. Events for Mobile Visitors 33
Enabling Extended User Agent Detection 33
Acquiring Tealeaf CX Mobile Events through the CX Mobile Dashboard 33
How Mobile Visitors Are Detected 33
Information inserted into the request 33
Mobile Events 35
Browser Traffic Type Event 35
Creating Other Mobile Events 36
Dimension Value Lists 37
Reporting on Mobile Events 37

Chapter 5. Reporting for Mobile Web 39
Tealeaf CX Mobile Dashboard 39
Building Your Own Reports 39

Chapter 6. Reporting for Mobile App . . 41
Pre-requisites 41
Two data transmission methods 41
Configuring Event Objects 42
Investigating the Data 42
Creating Reports 42
Tracking Variations 42
Search 43
Available Dashboards 43

Chapter 7. IBM Tealeaf documentation and help 45

Notices 47
Trademarks 49
Privacy Policy Considerations 49

© Copyright IBM Corp. 1999, 2014

Tealeaf CX Mobile User Manual

This manual details the IBM Tealeaf CX Mobile module for the IBM Tealeaf CX platform, which enables analysis and reporting on visitors who use mobile devices to access your web applications through mobile web browsers and mobile apps.

© Copyright IBM Corp. 1999, 2014

Chapter 1. Overview of CX Mobile

The IBM Tealeaf CX Mobile modules capture, replay, and analyze the experiences of visitors those are accessing your web application by using web browsers or mobile native applications on mobile devices. As the installation base of mobile devices continues to expand, gaining insight into this rapidly developing market is critical to making more informed decisions about optimizing your website for the mobile experience.

Note: The IBM Tealeaf CX Mobile module is a separately licensed module of the IBM Tealeaf CX platform. please contact your IBM Tealeaf representative.

- For more information about enabling, see "Enabling CX Mobile" on page 7.
- For more information about data that is acquired from mobile devices, see "Available Mobile Data by License" on page 3.

For customers who are deploying mobile native applications, the IBM Tealeaf CX Mobile for Mobile App components capture user interface events and application events and properties from the mobile native applications you deployed for your customers. Developers can integrate the supported Logging Frameworks with the deployed application and enable the capture of this rich set of application data for use in Tealeaf.

- See "Instrumenting CX Mobile for Mobile App" on page 8.

Given the wide array of mobile devices in use on the web, forward-thinking enterprises must be able to examine how to best serve this diverse and growing customer segment. Through IBM Tealeaf CX Mobile, you can monitor the mobile user experience with the same Tealeaf suite of analysis tools that are used for visitors on desktop systems. Additionally, Tealeaf's event-driven capabilities segment mobile users for detailed reporting to meet your enterprise requirements.

Differences in the Mobile Experience

The value of the mobile customer experience to the present and future of eCommerce cannot be overstated. Yet, that experience is fundamentally different from the user experience and expectations of the desktop browser. Mobile users:

- are task-oriented
- want efficient and quick resolution of their transactions
- get easily frustrated
- have a more personal point of view with online interactions

These characteristics suggest that management of the mobile customer's experience fits well into the kinds of activities that can be monitored through Tealeaf. Tealeaf's innovative methods for monitoring customer struggle provide unique insight into areas where your mobile customers are getting frustrated and potentially abandoning transactions. By deploying IBM Tealeaf CX Mobile, you can monitor mobile customer experience and processes with a fidelity not available in other solutions.

© Copyright IBM Corp. 1999, 2014

Benefits

IBM Tealeaf CX Mobile delivers these key benefits on the mobile user experience, which can be unavailable through other solutions:

- Visibility into mobile user success and failure:
  - Detect obstacles or issues without relying on user feedback
  - Understand usage by mobile devices across the user base, site, and apps
  - Identify cause without having to update or relaunch services
  - Visibility into usage patterns across the entire user base
- Accelerate time-to-market:
  - Stop waiting on user feedback before you make improvements
  - Rapidly evaluate mobile features: adoption, success, and failure points
  - Eliminate poor quality to deliver winning mobile services
- Make the right mobile investments:
  - Quantify® business impact to prioritize decisions: fix, invest, and remove
  - See the actual usage of mobile services rather than the expected usage

In addition to standard analytics capabilities in capturing user profiles and reporting on time-based activities, the Tealeaf mobile solution provides insight into why activities are happening through the following capabilities:

- Detection of user struggle
- Ability to drill down into visitor behavior to analyze individual sessions
- Ability to correlate visitor behavior with network data

Key Features of Tealeaf CX Mobile

- Capture of Web and Application Events: IBM Tealeaf CX Mobile enables the monitoring and capture of client-side interactions through mobile web browsers and native applications. These events are captured transparently to the user and submitted to Tealeaf for capture and processing through your installed Tealeaf solution.
  - Device demographics can be captured through the user agent string that is submitted by the device or the installed Tealeaf client framework that is used to monitor the device
  - Capture of exception messages for processing and rapid reporting
- Mobile Session Replay: IBM Tealeaf CX Mobile captures the complete set of interactions of every mobile visitor. You can replay captured sessions in a browser-level recording through Browser-Based Replay. Session replay for mobile devices accounts for browser capabilities, screen sizes, and other characteristics of the device and its browser.
  - Support for mobile-specific actions such as orientation change, swipe, and more
  - Render in replay by using screen dimensions, known device characteristics, and orientation
  - For more information about search and replay for Mobile Web, see Chapter 2, “Search and Replay for Mobile Web,” on page 11.
  - For more information about search and replay for Mobile App, see Chapter 3, “Search and Replay for Mobile Apps,” on page 21.
  - For more information about Browser-Based Replay, see "CX Browser Based Replay" in the *IBM Tealeaf cxImpact User Manual*.

- Mobile Visitors and Device Metrics: IBM Tealeaf CX Mobile enables detailed data capture on mobile visitors and their devices. Usage statistics and trending patterns can be monitored through provided reports. You can also create ad hoc visitor segments that are based on mobile attributes such as device manufacturer, operating system, screen resolution, and more.
  - For more information about visitor segments, see "Analyzing Visitor Segments" in the *IBM Tealeaf cxResults User Manual*.

Available Mobile Data by License

Depending on the products you have Tealeaf license, the following data is captured for sessions experienced through mobile devices.

Table 1. Available Mobile Data by License

License	Capability	Description
IBM Tealeaf cxImpact	Capture user agent data	When extended user agent parsing is enabled, IBM Tealeaf cxImpact can capture data that is submitted with each request by the visitor's user agent. This data is inserted into the request by the Tealeaf Reference session agent, which uses a deployed version of the `browscap` public standard to look up more data. Part of this data insertion is identifying whether the session was initiated from a mobile device or not. **Note:** If you do not deployIBM Tealeaf CX UI Capture j2, some aspects of the mobile visitor experience cannot be replayed. For best results in displaying orientation change, enabling resizing of the replay view screen, you must deploy UI Capture. See the *IBM Tealeaf UI Capture for j2 Guide*. • Extended user agent parsing is enabled by default. See "Tealeaf Reference Session Agent" in the *IBM Tealeaf CX Configuration Manual*. • For more information about user agents, see "Managing User Agents" in the *IBM Tealeaf cxImpact Administration Manual*.

Table 1. Available Mobile Data by License (continued)

License	Capability	Description
IBM Tealeaf CX license (IBM Tealeaf CX UI Capture for AJAX) **Note:** IBM Tealeaf CX UI Capture for AJAX is only available to legacy users.	Capture mobile device properties and UI events (gesture, touch, and so on)	When the IBM Tealeaf CX license is enabled, customers can deploy the IBM Tealeaf CX UI Capture for AJAX solution. This Javascript-based solution is deployed from your web servers to the visitor's browser. It captures mobile-specific events, such as gesture and touch events, as well as mobile device properties. **Note:** This license is not enforced in the product and operates independently of the other licenses. It is managed through limited distribution of the library. • For more information about IBM Tealeaf CX UI Capture for AJAX, see "UI Capture FAQ" in the *IBM Tealeaf UI Capture for Ajax FAQ*. • For more information about mobile-specific features of IBM Tealeaf CX UI Capture for AJAX, see "UI Capture for Ajax Reference" in the *IBM Tealeaf UI Capture for Ajax Guide*.
IBM Tealeaf CX license (IBM Tealeaf CX UI Capture for AJAX)	Capture mobile device properties and UI events (gesture, touch, and so on)	When the IBM Tealeaf CX license is enabled, customers can deploy the IBM Tealeaf CX UI Capture for AJAX solution. This Javascript-based solution is deployed from your web servers to the visitor's browser. It captures mobile-specific events, such as gesture and touch events, as well as mobile device properties. **Note:** This license is not enforced in the product and operates independently of the other licenses. It is managed through limited distribution of the library. • For more information about IBM Tealeaf CX UI Capture for AJAX, see "UI Capture FAQ" in the *IBM Tealeaf UI Capture for Ajax FAQ*. • For more information about mobile-specific features of IBM Tealeaf CX UI Capture for AJAX, see "UI Capture for Ajax Reference" in the *IBM Tealeaf UI Capture for Ajax Guide*.

Table 1. Available Mobile Data by License (continued)

License	Capability	Description
IBM Tealeaf CX license (IBM Tealeaf CX UI Capture j2)	Capture mobile device properties and UI events (gesture, touch, and so on)	When the IBM Tealeaf CX license is enabled, customers can deploy the IBM Tealeaf CX UI Capture j2 solution. This Javascript-based solution is deployed from your web servers to the visitor's browser. It captures mobile-specific events, such as gesture and touch events, as well as mobile device properties. **Note:** This license is not enforced in the product and operates independently of the other licenses. It is managed through limited distribution of the library. • For more information about IBM Tealeaf CX UI Capture j2, see the *IBM Tealeaf UI Capture for j2 Guide*.
IBM Tealeaf CX Mobile module	Capture mobile user agent data	When the IBM Tealeaf CX Mobile module is licensed, the Tealeaf Reference session agent can perform more mobile-specific lookups for user agent information by using the WURFL public standard. This standard contains detailed data on known mobile devices, which are based upon the user agent string that is submitted in the request. • IBM Tealeaf CX Mobile requires the XML version of the WURFL standard to be converted to an internally usable CSV format. If the IBM Tealeaf CX Mobile module is not licensed, access to the utility provided by Tealeaf to perform this conversion is forbidden. For more information about WURFL and this utility, see "Overview of User Agents for CX Mobile" in the *IBM Tealeaf CX Mobile Administration Manual*.

Table 1. Available Mobile Data by License (continued)

License	Capability	Description
IBM Tealeaf CX Mobile module	Replay of mobile user agent data, device properties, and UI events	When IBM Tealeaf CX Mobile is licensed, the replay of mobile-sourced sessions is supported in Browser-Based Replay (BBR). **Note:** When IBM Tealeaf CX Mobile module is not licensed, the following limitations are applied to replay of mobile-based sessions: 1. No display of mobile-specific events, such as scroll and touch 2. No display of mobile device data during replay 3. No use of a mobile skin (Extended user agent parsing is also required.) 4. No display of device orientation changes 5. No resizing of the screen to the mobile browser dimensions The underlying data is captured independent of the license; enabling the license allows mobile-based replay of sessions that are already captured. • BBR is a Portal-based method of replaying sessions. For more information about BBR replay, see "CX Browser Based Replay" in the *IBM Tealeaf cxImpact User Manual*.
IBM Tealeaf CX Mobile for Mobile App	Capture of native app events for iOS and Android systems	When IBM Tealeaf CX Mobile is licensed, customers can request access to the iOS and Android Logging Frameworks. When these frameworks are deployed as part of the native applications that you build and deploy to your visitors by using iOS and Android devices, a large set of device properties and application events are captured and submitted to Tealeaf for processing, enabling close monitoring of device-specific activities. **Note:** This license is not enforced in the product and operates independently of the other licenses. It is managed through limited distribution of the library. • See the *IBM Tealeaf iOS Logging Framework Guide*. • See the *IBM Tealeaf Android Logging Framework Guide*.

For more information about applying updated license keys to your Tealeaf solution, see "Managing Your Tealeaf License Key" in the *IBM Tealeaf cxImpact Administration Manual*.

Getting Started with Tealeaf CX Mobile

IBM Tealeaf CX Mobile is pre-configured to analyze on sessions that are captured from visitors by using mobile devices. To meet the requirements of your enterprise, you must review the following configuration items and reports.

1. Reference data: Tealeaf can identify mobile devices that are based on the device type or browser type. Additionally, Tealeaf can monitor specific features of the device, such as video streaming, picture display, and JavaScript capabilities.
   - If your UI Capture is licensed and deployed to track user interface events, events specific to mobile device browsers can be captured and processed by Tealeaf.
   - See "Configuring Tealeaf for Mobile Visitors" in the *IBM Tealeaf CX Mobile Administration Manual*.
2. WURFL: Tealeaf relies on a publicly available standard for identifying mobile devices. This standard requires regular updating from the source.
   - See "Configuring Tealeaf for Mobile Visitors" in the *IBM Tealeaf CX Mobile Administration Manual*.
3. Creating events: Based on the captured user agent data, you can create events that can be used to identify mobile visitor activities and device capabilities. Based on these events, you can create alerts and reports for display in the Portal.
   - See Chapter 4, “Events for Mobile Visitors,” on page 33.
4. Reports on mobile visitors and devices: As needed, you can download report templates or create custom reports to surface information about the mobile visitor experience.
   - See Chapter 5, “Reporting for Mobile Web,” on page 39.
5. Mobile Web Replay: Segments from mobile visitors and devices can be replayed through Browser-Based Replay in the Tealeaf Portal. Browser-Based Replay can be configured to replay the visitor session at the appropriate screen size for the device in use and to indicate user interface events.
   - See Chapter 2, “Search and Replay for Mobile Web,” on page 11.
6. Mobile App Replay: Sessions can be replayed as screen captures or as an HTML representation of the native mobile session with information related to multiple screens. You can replay mobile app sessions in Browser Based Replay.
   - See Chapter 3, “Search and Replay for Mobile Apps,” on page 21.

Enabling CX Mobile

You can learn different options of enabling CX Mobile in this section.

Acquire License Key

IBM Tealeaf CX Mobile is enabled through the license key that you enter in the Tealeaf Installer at upgrade time. A new license key is required. Contact your IBM Tealeaf representative.

Acquire Latest BrowsCap.csv

BrowsCap is a publicly maintained standard for identifying user agents on the web. You must download and install the latest version of Browscap.csv into your Tealeaf solution.

- See "Maintaining the CX System" in the *IBM Tealeaf CX Installation Manual*.

Acquire Latest WURFL

WURFL is a publicly maintained standard for identifying mobile devices in use on the web. You must download the latest version of WURFL.csv into your Tealeaf solution.

- See "Maintaining the CX System" in the *IBM Tealeaf CX Installation Manual*.

Convert the latest WURFL data to Tealeaf format

After you acquire WURFL, you must convert it to a form that is usable by your Tealeaf solution. Tealeaf provides an external tool to convert the downloaded file.

Use the WURFL2csv.exe program to convert the WURFL .xml file into the required format.

- See "User Agent Tools" in the *IBM Tealeaf cxImpact Administration Manual*.

Import the Mobile Dashboards

You can learn about importing mobile dashboards in this section.

Download

Tealeaf published dashboards for IBM Tealeaf CX Mobile, which contain the event definitions that are required to capture mobile data for aggregation into dashboard reports.

Import

Use the Report Manager to bring the mobile event reports and dashboard into the system.

- See "Importing and Exporting Reports" in the *IBM Tealeaf cxView User Manual*.

Update the Event Values Lists with the latest User Agent data

Event Value Lists are used to display the different browser types, mobile devices, and platforms. The UAValueListCreator.exe tool creates these values lists, which you can them import them.

- See "User Agent Tools" in the *IBM Tealeaf cxImpact Administration Manual*.

Instrumenting CX Mobile for Mobile App

IBM Tealeaf CX Mobile for Mobile App includes a set of Logging Frameworks, which are deployed by your developers with mobile native applications served to your customers. When deployed and enabled, the Tealeaf Logging Frameworks captures user interface events and application events and properties and submit them in batches to IBM Tealeaf for capture. The information can be captured as a single screen capture or as an HTML representation with information related to multiple screens. In this manner, you can closely monitor a predefined set of events or customize your own events on the application and how users interact with it.

Data that is submitted to Tealeaf is decoded in the Windows pipeline by using a specialized session agent and is then available for search and reporting as data inserted into the request.

IBM Tealeaf provides the following Logging Frameworks.

- See the *IBM Tealeaf CX Mobile iOS Logging Framework Guide*.
- See the *IBM Tealeaf CX Mobile Android Logging Framework Guide*.

Chapter 2. Search and Replay for Mobile Web

Tealeaf sessions that were experienced through a mobile device can be replayed through Browser-Based Replay in the Portal.

Browser-Based Replay replays the visitor experience with your web application. Screen size is adjusted to account for the smaller displays. Javascript capabilities are curtailed to match the capabilities of mobile device browsers. Other characteristics of the mobile browser are also applied to the replay view in BBR.

- If UI Capture is deployed, orientation changes, scroll events, and other user interface events are represented in replay. See “User interface events from mobile browsers in BBR” on page 19.

Through mobile replay, Tealeaf users can identify problem areas in the web application's presentation to visitors to improve it and resolve disputes.

Identifying Mobile Web Sessions from Mobile Devices

Tealeaf identifies that a session is experienced by using a mobile browser through user agent information that is submitted in each request by the browser to a web server.

When a hit is processed through the Canister, the Windows pipeline scans the request for this user agent information. It is then matched up against a public standard of known mobile devices.

- See "Tealeaf Reference Session Agent" in the *IBM Tealeaf CX Configuration Manual*.

This capability is enabled by default for fixed user agents, such as desktop browsers. For mobile devices, more configuration is required, using a different standard that is known as WURFL.

- See "Configuring Tealeaf for Mobile Visitors" in the *IBM Tealeaf CX Mobile Administration Manual*.

If a match for the user agent is found in the WURFL standard, more information about the device from WURFL is inserted into the request of each hit, including the screen resolution and JavaScript capabilities of the mobile browser. This information is inserted into the `[ExtendedUserAgent]` section of the request:

```
[ExtendedUserAgent]
TLT_BROWSER=Openwave Mobile Browser
TLT_BROWSER_VERSION=Openwave Mobile Browser6.2
TLT_BROWSER_PLATFORM=
TLT_TRAFFIC_TYPE=MOBILE
TLT_BROWSER_JAVASCRIPT=false
TLT_BROWSER_COOKIES=true
TLT_BRAND=LG
TLT_MODEL=LG MX510
TLT_SCREEN_HEIGHT=220
TLT_SCREEN_WIDTH=176
TLT_COLOR_DEPTH=65536
TLT_PICTURE_SUPPORT=true
TLT_VIDEO_SUPPORT=false
TLT_STREAMING_SUPPORT=false
```

© Copyright IBM Corp. 1999, 2014

In the example, the TLT_TRAFFIC_TYPE=MOBILE name-value pair indicates that Tealeaf Reference session agent is successfully matched the TLT_BROWSER against the WURFL public standard for mobile user agents.

- For more information about how the type of the user agent is identified, see "Configuring User Agent Events" in the *IBM Tealeaf cxImpact Administration Manual*.

Using the previous information, you can perform searches for mobile sessions. To improve search performance, you must use and create event objects through the Tealeaf Event Manager to identify mobile visitors.

Tealeaf provides a Traffic Type hit attribute to scan the request for the value of the TLT_TRAFFIC_TYPE variable name. For example, the value for this hit attribute for the hit is MOBILE.

The hit attribute is used to populate the dimension Traffic Type, which can be used as a criterion for an event search term. For example, you can search for specific events where the Traffic Type dimension value is MOBILE. Searches of this type return all sessions in which the event occurred when the Traffic Type dimension indicated that it was a mobile session.

To locate mobile sessions, you must search for an event that occurs in every session, such as Hit Count, which is also associated with the Traffic Type dimension. Whenever that event fires, the value of the Traffic Type dimension is also recorded with the event data in the request.

The combination of event=Hit Count and dimension=Hit Count and dimension_value=MOBILE is then used to locate sessions that Tealeaf identified as being sourced from a mobile device.

- For more information about searching for mobile sessions, see “Search.”

Search

The ability to search for mobile sessions requires that extended user agent parsing is enabled in the Tealeaf Reference session agent that is deployed in your pipeline.

- See "Tealeaf Reference Session Agent" in the *IBM Tealeaf CX Configuration Manual*.

Portal Search

Search examples:

- “Searching for mobile sessions by Traffic Type”
- “Searching for mobile visitors” on page 13

Searching for mobile sessions by Traffic Type

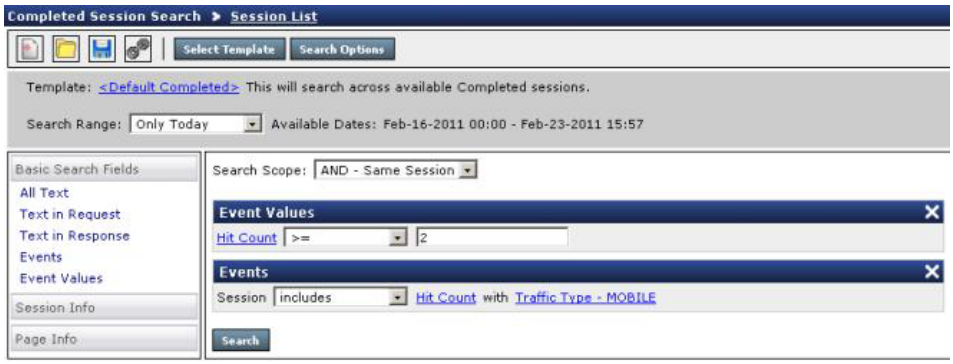
For example, you can use the following method to search for mobile sessions where the hit count is more than 1.

1. From the Portal menu, select **Search** > **Completed Sessions**.
   - You can select **Active Sessions** or All Sessions. These search options are available for those types of searches, as well.
   - See "Searching Session Data" in the *IBM Tealeaf cxImpact User Manual*.
2. Select the **Completed** search template, if it is not selected already.
3. From the **Search Scope**, select **AND - Same Session**.
4. In the search pane, click **Event Values**.

5. Click **<Select an event**. In the Event Selector, select `Hit Count`.
6. Next, select the >= value from the drop-down. Enter the value 2.
7. In the **Search** pane, click **Events**. A second search term is added.
8. In the **Events** pane, Click **<Select an event**. In the Event Selector, select `Hit Count`.
9. Click **Any Dimension**.
10. In the Dimension Selector, select `Traffic Type` and click **Select**.
11. The Dimension Value Selector is displayed. Select `Mobile`.

    Note: If you have Tealeaf license and deployed a Tealeaf client framework to capture session data from mobile native applications, you can search for sessions of those types by selecting the value `Mobile_App` from the Dimension Value Selector. See "Integrating Client Framework Data into Tealeaf" in the *IBM Tealeaf Client Framework Data Integration Guide*.

    - Click **Select**.
12. The search screen look like:



    Portal Search Configured to Find Mobile Sessions
13. Click **Search**.
14. Results are displayed in a session list.
    - See "Searching Session Data" in the *IBM Tealeaf cxImpact User Manual*.

Searching for mobile sessions from native applications

See Chapter 3, “Search and Replay for Mobile Apps,” on page 21.

Searching for mobile visitors

You can use the method to search the visitors tracked by IBM Tealeaf cxResults for mobile sessions.

Note: cxResults is a component of CX platform, a separately licensable component of the Tealeaf CX platform. For more information, please contact your IBM Tealeaf representative.

To begin searching by visitors, select **Search** > **Visitors**. Specify the search criterion by using the preceding sets of steps.

- See "Searching for Visitors" in the *IBM Tealeaf cxResults User Manual*.

Replay

Mobile Replay overview

You can replay visitor sessions that were experienced through mobile devices through Browser-Based Replay through the Tealeaf Portal.

For more information about BBR, see "CX Browser Based Replay" in the *IBM Tealeaf cxImpact User Manual*.

A mobile license is required for the mobile skin to show in the Mobile Replay.

IBM Tealeaf receives mobile dimensions from two sources, IBM Tealeaf UI Capture and WURFL. WURFL is used as a fallback if UI Capture is not installed. If both sources are missing, there is no data to render the mobile skin. A default dimension is applied and you will see the skin with no page inside.

Note: IBM Tealeaf UI Capture can provide better dimensions. Therefore, it is recommended to have UI Capture installed for better replay of mobile sessions.

For BBR, sessions that are delivered for replay are rendered on the Replay Server. This content is delivered to Tealeaf user's browser and rendered in an iframe inside of that browser.

Sessions that are requested by a BBR user are passed by the Replay Server to a renderer that is appropriate for the source of the session. For example, Firefox sessions are passed to the Gecko renderer, while Chrome/WebKit sessions are passed to the Chrome renderer.

- The Chrome renderer must be enabled. See "Configuring the Replay Server" in the *IBM Tealeaf CX Configuration Manual*.

Note: Browser-specific styling cannot be appropriately applied to sessions that are delivered to a different type of browser. For example, WebKit-specific styles cannot be applied to a session that is rendered for and delivered to a Firefox browser.

Limitations in Replay of Mobile Visitors

Replay of mobile visitor sessions works best for web pages that are designed for a mobile platform. These web pages are designed to fit the smaller screens of mobile devices and work well within the limitations of the device.

Replay of web pages that are targeted for personal computers can vary widely from the actual experience. Many cell phones and cell phone networks modify the web page to best fit the display. Typical modifications include collapsing of frames, restructuring of tables, and resizing of images.

Because these modifications are specific to the device or network, Tealeaf does not attempt to emulate these behaviors. As standards improve for presentation of content that is targeted for personal computer screens delivered to small mobile screens, Tealeaf will improve this emulation.

Note: Replay of sessions for mobile devices that are captured from web applications that are designed for mobile browsers is likely to feature improved performance and visual display. However, if the content is delivered for a

mobile-only device, there can be visual discrepancies in the replay, due to differences in the rendering and display issues of the browser controllers that are used in BBR.

Note: Depending on the pixel density of the device and the pixel density of the monitor on which you are viewing the replay, the physical size of the displayed image cannot match the original image.

- For Android devices, if the width or height is less than 320 pixels, the image is not scaled.

Note: When IBM Tealeaf CX Mobile module is not licensed, the following limitations are applied to replay of mobile-based sessions:

- No display of mobile-specific events, such as scroll and touch
- No display of mobile device data during replay
- No use of a mobile skin (Extended user agent parsing is also required.)
- No display of device orientation changes
- No resizing of the screen to the mobile browser dimensions

The underlying data is captured independent of the license; enabling the license allows mobile-based replay of already captured sessions.See Chapter 1, “Overview of CX Mobile,” on page 1.

For more information about replay for mobile native applications, see Chapter 3, “Search and Replay for Mobile Apps,” on page 21.

Limitations for Android

1. Android-based devices can screen capture the main window but cannot capture pop-up windows.
2. For hybrid applications, screen capture can be captured in a random order, and some screen capture can be missing due to timing issues.
3. Clicks of the device buttons are not captured by the Android logging framework.
4. When an Android-based web browser is minimized, the application is slept, instead of killed. As a result, session identifiers are not renewed when the application is reawakened, and the same session identifier can be used for what are two separate visitor sessions. When hits from this visitor's sessions are gathered into Tealeaf, the session data is mixed under a single session identifier.
   - For more information about debugging this issue, see "Tealeaf Android Logging Framework Installation and Implementation" in the *IBM Tealeaf Android Logging Framework Guide*.

BBR configuration

You can configure the BBR by using following steps:

For user groups

Through the Portal Management page, Tealeaf administrators can configure BBR replay to auto-resize according to the screen of the visitor's device for Tealeaf user groups.

1. Log in to the Tealeaf Portal as an administrator.
2. In the Portal menu, select **Tealeaf** > **Portal Management**.
3. In the left pane, click **CX User Administration**.
4. Click **Groups**.

5. Select the group.
6. Click **Browser Replay Profile**.
7. Select the **Resize Replay** pane to **Match Session** check box.
8. Click **Save**.

For individual users

When a session is selected for replay in BBR, you can resize the display window that is based on the information provided by the visitor's browser.

1. In BBR, select **Options** > **Options** > **Resize Replay Pane to Match Session**.

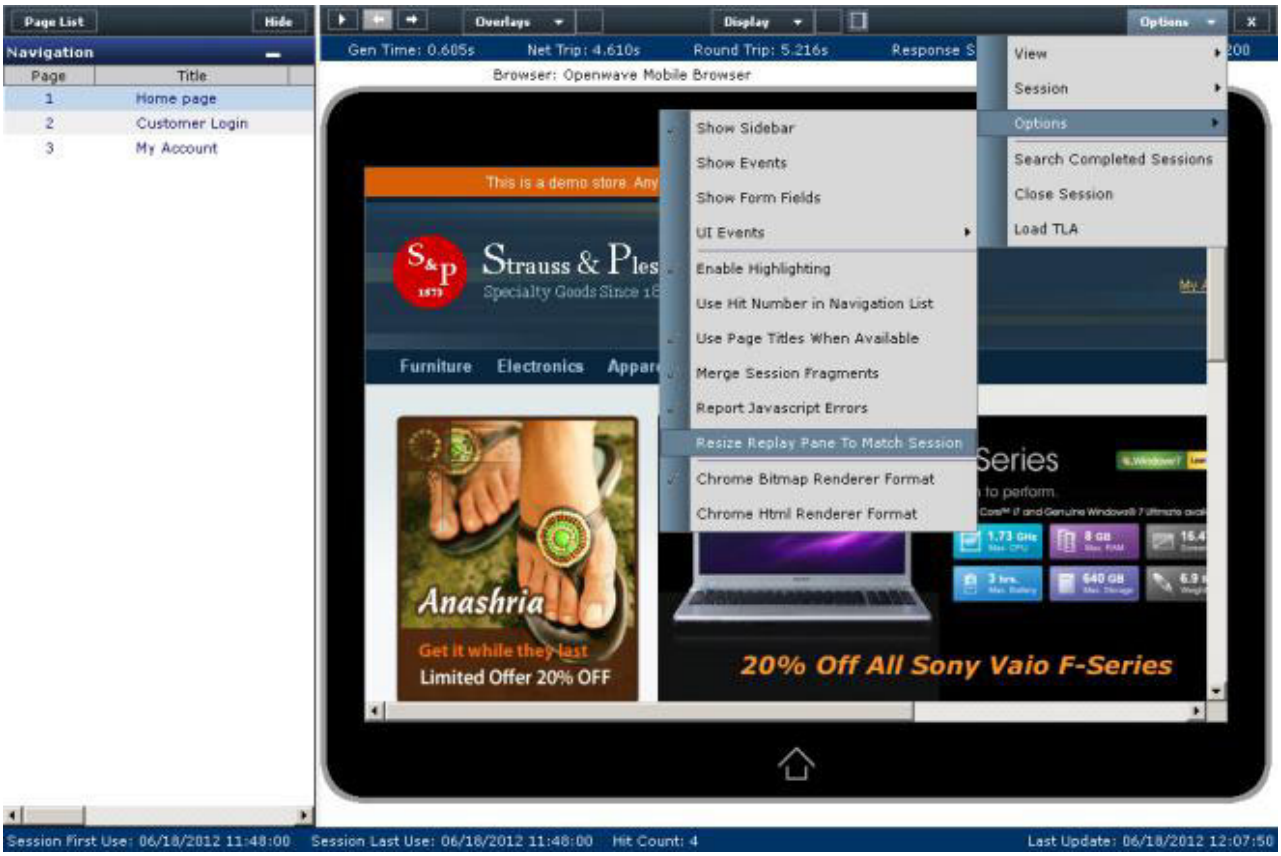


Figure 1. BBR options for mobile devices

2. If device window size information is available in the user agent data for the visitor's browser, then that window size is applied to BBR.

See "Browser Based Replay Interface" in the *IBM Tealeaf cxImpact User Manual*.

BBR replay screen

You can replay mobile sessions by using the same controls to replay desktop sessions:

1. In the Sessions List, select the session to replay.
   - If you searched by visitor, click the **Sessions** link next to the appropriate results in the Visitors List.

Figure 2. Searching for Mobile Sessions in BBR

2. To replay, click the **Camera** icon ( ).
3. In the Replay Session dialog, click **Browser**.
4. BBR is opened to replay the session.
5. For more information about resizing the window that is based on the visitor's browser, see "BBR configuration" on page 15.

Figure 3. BBR replay of a mobile device

For more information about Browser-Based Replay, see "CX Browser Based Replay" in the *IBM Tealeaf cxImpact User Manual*.

- If UI Capture is licensed and deployed, more UI events are displayed during replay. See “User interface events from mobile browsers in BBR” on page 19.

User agent information in BBR

User agent information is inserted in a title bar above the replay pane.

Note: This information is available only if the IBM Tealeaf CX Mobile module is licensed and properly configured. See "Configuring Tealeaf for Mobile Visitors" in the *IBM Tealeaf CX Mobile Administration Manual*.

In the table below, you can review the content of each field, its source, and how it can be accessed.

Table 2. User agent information in BBR

Item	Source Request field	Description
`Browser`	`TLT_BROWSER`	Visitor browser type • This value is also available in the Tealeaf System Hit Attribute `Browser`. See "TEM Hit Attributes Tab" in the *IBM Tealeaf Event Manager Manual*.
`Browser Platform`	`TLT_BROWSER_PLATFORM`	The mobile device platform
`Browser Major Version`	`TLT_BROWSER_VERSION`	The version X.0 of the browser
`Traffic Type`	`TLT_TRAFFIC_TYPE`	The type of traffic, as identified by extended user agent parsing • This data is also captured in the Traffic Type dimension. See "TEM Dimensions Tab" in the *IBM Tealeaf Event Manager Manual*.
`Replay Renderer`		The type of renderer that is used by Replay Server to render the session • The type of renderer is determined by the configured renderer types and the browser from which the session was originally experienced. See "Configuring the Replay Server" in the *IBM Tealeaf CX Configuration Manual*.

Rendered at original screen dimensions in BBR

The BBR replay pane is rendered at the screen dimensions reported by the mobile browser.

Note: If no screen information is reported in the title bar for a session that is identified as mobile, the screen dimension data was not inserted into the request by the Windows pipeline session agent. This omission typically occurs when the mobile browser cannot display JavaScript or that feature is disabled.

Additional configuration is required. See “BBR configuration” on page 15.

Screen Dimensions for Mobile Devices

BBR and RTV have multiple mechanisms for evaluating the screen dimensions as reported from the mobile device.

1. If UI Capture is deployed and is submitted UI events to Tealeaf for capture, then the screen dimensions that are used in replay are taken UI events that are captured in first hit of the session in replay from the browser of the mobile device.
2. If UI Capture is not deployed or if UI events are not reported and captured in the first hit, then screen dimensions are taken from the WURFL standard for the device that is used by the visitor.

   Note: Since the device and the browser for the device can not report the same values, it is possible that replay of a session by using the screen dimensions reported by WURFL can not exactly match the dimensions of the captured session.
3. If neither of the methods yields values for the screen dimensions, BBR and RTV set the screen dimensions during replay to the full, normal replay size.

User interface events from mobile browsers in BBR

If UI Capture is deployed, user interface events that are captured from mobile browsers are displayed in the Viewable Pages List in BBR.

- See the *IBM Tealeaf UI Capture for j2 Guide*.

  Note: Replay of scroll events that are captured by UI Capture is supported for mobile sessions only in BBR only.

In addition to actions such as clicks, gestures such as pinching and zoom in and zoom out are displayed in BBR.

When the orientation changes in the session, the mobile skin is displayed along the new axis in BBR.

Note: Pinch and zoom gestures can be captured on the iOS platform only. They cannot be captured on the Android platform.

Troubleshooting

This section contains some basic troubleshooting information for replay of mobile visitor sessions.

Traffic Type is not populated

If you are trying to replay what a mobile session in BBR, you can notice that the Traffic Type value is set to `????`.

In this case, mobile replay cannot be properly configured. Support for mobile replay requires a separate installation and configuration and is not enabled by default. You cannot download, install, and convert the public standard `WURFL.csv` for use in Tealeaf.

Note: Use of WURFL conversion tools is a component of CX Mobile, a separately licensable component of the Tealeaf CX platform. For more information, please contact your IBM Tealeaf representative.

- See "Configuring Tealeaf for Mobile Visitors" in the *IBM Tealeaf CX Mobile Administration Manual*.

UI Events not displayed in replay

If you are not seeing UI events in a mobile session during replay, check the request of any hit in the session to see whether the following value is present in the `[ExtendedUserAgent]`:

```
TLT_BROWSER_JAVASCRIPT=false
```

If the visitor's browser does not support JavaScript or is not configured to enable JavaScript to run, then the UI Capture JavaScripts required to capture and submit UI events did not run for the session.

- See "Browser Based Replay Interface" in the *IBM Tealeaf cxImpact User Manual*.

Chapter 3. Search and Replay for Mobile Apps

IBM Tealeaf CX Mobile Android Logging Framework and IBM Tealeaf CX Mobile iOS Logging Framework can be enabled to capture native mobile app data.

Sessions can be captured and replayed as screen captures for visual review and analysis of the data.

Sessions can be captured as HTML representations with information related to multiple screens. Sessions that are rendered through HTML representation of the native mobile session can only be replayed in Browser Based Replay.

Sessions can also be captured and replayed as screen captures for visual review and analysis of the data.

For all sessions sourced from mobile native applications, you can search through the Portal to locate them.

Before You Begin

Before you begin, you must configure the attributes and event objects to capture important data from your mobile native applications.

- See "Integrating Client Framework Data into Tealeaf" in the *IBM Tealeaf Client Framework Data Integration Guide*.

Replaying mobile app sessions through JSON requires configuration of the IBM Tealeaf Logging Framework.

- CX Mobile Android Logging Framework: See "UPDATE TITLE HERE" in the *IBM Tealeaf CX Mobile Android Logging Framework Guide*.
- CX Mobile iOS Logging Framework: See "UPDATE TITLE HERE" in the *IBM Tealeaf CX Mobile iOS Logging Framework Guide*.

Identifying Mobile App Sessions

In session data, sessions that are generated from mobile native applications are identified by the following request variable, which is inserted into the HTTP header:

```
HTTP_X_TEALEAF=device (<framework>) Lib/<version>
```

where

- `device` = a hardcoded string
- `<framework>` = `iOS` or `Android`
- `Lib/` = a hardcoded string
- `<version>` = the version number of the capturing framework

For JSON-based versions of UI Capture, the header value is `UIC` in the previously mentioned format.

- For XML-based versions of UI Capture, the header is the following exactly: `HTTP_X_TEALEAF=ClientEvent`

© Copyright IBM Corp. 1999, 2014

Mobile-Related Event Objects Provided by Tealeaf

In this section, you can find information about mobile related event objects in Tealeaf.

Mobile Device Type hit attribute

For all client framework sessions, the header information is detected by the `Mobile Device` hit attribute. This hit attribute detects the values between the parentheses, the `<framework>` value.

Mobile Device dimension

The values that detected by using the hit attribute are recorded to the `Mobile Device` dimension.

- If the `Mobile Device Type` hit attribute is found, the `Mobile Device` building block event is triggered. This event is used only to record the values into this dimension.

The following values can be recorded:

Dimension Value
Description

`iOS` Indicates a session that is captured from an iOS device by the IBM Tealeaf CX Mobile iOS Logging Framework

`Android`
Indicates a session that is captured from an Android device by the IBM Tealeaf CX Mobile Android Logging Framework

null value

Note: For any other session, including sessions that are captured from IBM Tealeaf CX UI Capture j2, a null value is recorded.

Associated Events

The `Mobile Device` dimension is pre-configured to be included in the `Traffic Type` report group. Since this report group is associated with a number of events that are provided by Tealeaf, when those events are triggered, values for the `Mobile Device` dimension are recorded as soon as the installation or upgrade is completed.

- In the sections below, the `Page Count` event is used as an example event for locating sessions by using this dimension. This event occurs once per session at the end of the session, which provides the means of scanning all sessions for this dimension value.

  Note: Because the `Page Count` event is evaluated at the end of the session, it cannot be used as a means of locating mobile native application sessions among your active sessions; the event not yet fired in active sessions.

  – To use the `Mobile Device` dimension to locate active sessions, you must associate the dimension or one of its report groups with an event that occurs on the first hit of the session, every hit, after every hit, or any step-based trigger.

  Note: You can use the Report Builder to identify the events with which a dimension is associated. See "Tealeaf Report Builder" in the *IBM Tealeaf Reporting Guide*.

- You can associate the `Traffic Type` report group with other dimensions or the `Mobile Device` dimension with other report groups to expand access to this segmenting information.

- For more information about associating dimensions and report groups with events, see "TEM Events Tab" in the *IBM Tealeaf Event Manager Manual*.

Search

You can use the choices in the following section to locate sessions that are sourced from mobile native applications.

Portal Search

You can use the steps below to locate the above items through the search facilities in the Portal.

- For more information about portal search in general, see "Searching Session Data" in the *IBM Tealeaf cxImpact User Manual*.

Search by dimension value in the Portal

Using the provided event objects, you can search for completed sessions from mobile native applications through the Portal.

Note: This example uses an event that is calculated on each session but not until the end of the session. So, this example cannot be used to find all instances among active sessions. To locate active sessions, you must select a different event, which occurs on every hit.

1. Log in to the Portal.
2. From the Portal menu, select **Search** > **Completed Sessions**.
3. Specify the template and Search Range as needed.
4. To remove any fields in the search panel, click the **X** icon in the upper-right corner.
5. In the left panel, click the **Events category**.
6. The **Events** search field is added to the search panel.
   - If this field is not available, you must select a different search template. See "Searching Session Data" in the *IBM Tealeaf cxImpact User Manual*.
   - If no search template contains this field, it must be added to at least one search template. See "Configuring Search Templates" in the *IBM Tealeaf cxImpact Administration Manual*.
7. This field searches for the occurrence of specific events and optionally dimension values. In this example, the Tealeaf-provided event `Page Count` is used, and the `Mobile Device` dimension is already associated with it.
   - For more information about creating events to track mobile native application data, see "Integrating Client Framework Data into Tealeaf" in the *IBM Tealeaf Client Framework Data Integration Guide*.

   a. Click **<Select an event**.
   b. In the **Event Selector**, open the Tealeaf Standard Events label.
   c. Select the **Page Count** event. Click **Select**.
   d. The `Page Count` event is selected.
   e. Click **Any Dimension**.
   f. In the Dimension Selector, select the `Mobile Device` dimension.

      Note: If the `Mobile Device` dimension is not available, the report group that contains it (`Traffic Type` report group) is not associated with the event that you selected to use.

g. In the Dimension Value Selector, select one of the following values that are depending on the type of session for which you are looking:
   - `Android`
   - `IOS`

h. Click **Select**. The dimension value is selected as part of the search term.

8. To search for sessions from one of multiple mobile native application frameworks:
   a. Change the Search Scope value to `OR - Any Session`.
   b. Repeat the steps to add the `Page Count` event by using the `Mobile Device` dimension.
   c. For the dimension value, select a different mobile native application type.
9. To search for sessions that are initiated from either iOS or Android devices, your search page must look like the:

Figure 4. Portal Search - Event + Dimension Value search terms

10. You can modify your search as needed.

    Note: Set the Search Range to be as narrow as possible to locate the necessary sessions.
11. When you are ready to search, click **Search**.
12. Results are displayed in the default session list. See "Search Results."

Search Results

After your search results are returned, they are displayed in the default session list template that is associated with the search template that you used.

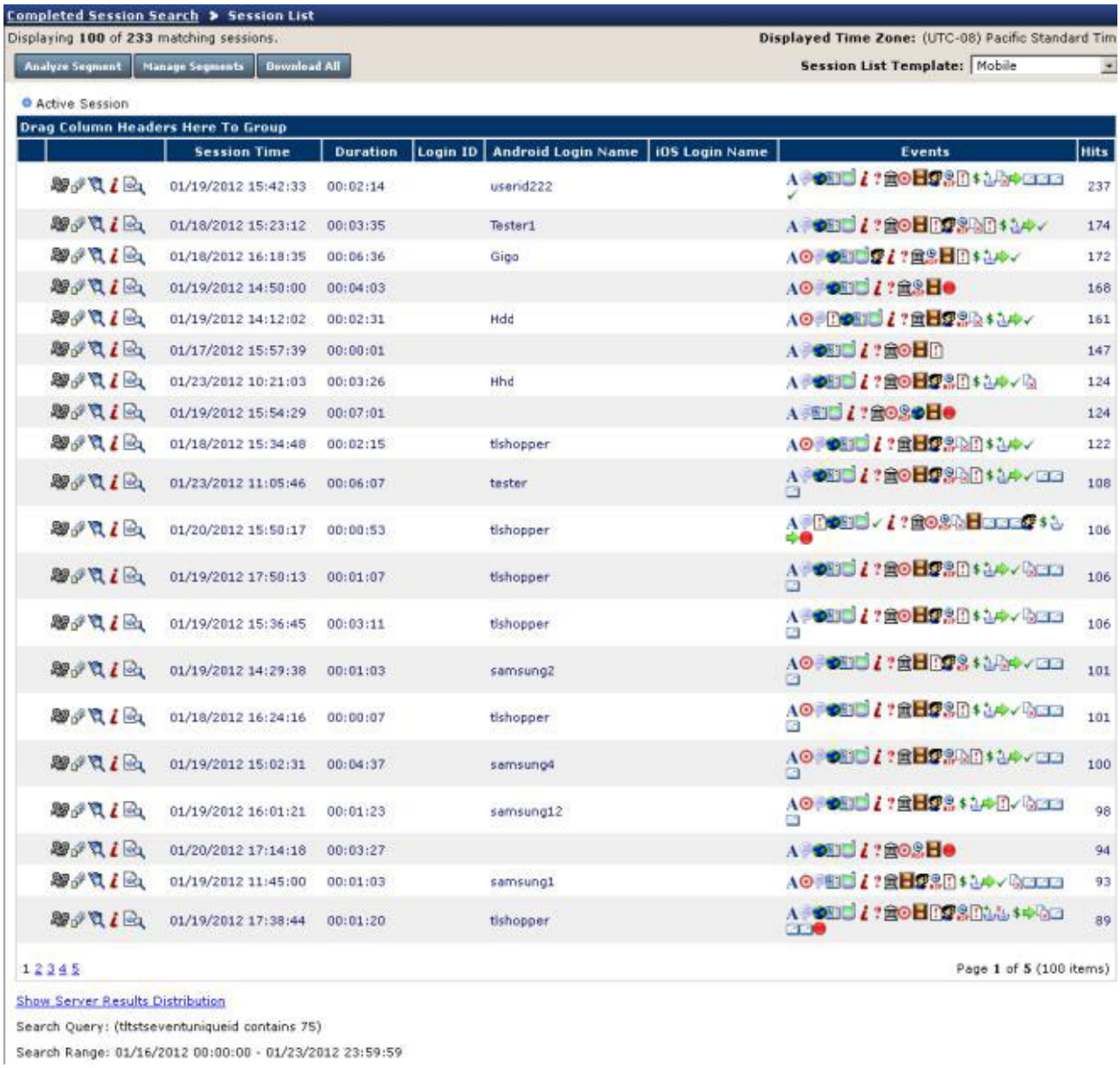


Figure 5. Portal Search - Search Results

The previous session is configured to display search results for all mobile sessions. The session list includes columns for the user identifier that is captured by each of the deployed Logging Frameworks.

- For more information about configuring search templates, see "Configuring Search Templates" in the *IBM Tealeaf cxImpact Administration Manual*.

The following commands are available:

Table 3. Search Results.

Command	Icon	Description
Replay		Displays the session in the browser. See “Replay of Mobile App Sessions through Screen Captures” on page 28.

Table 3. Search Results (continued).

Command	Icon	Description
Page List		View the page list for the session. See "Searching Session Data" in the *IBM Tealeaf cxImpact User Manual*.
QuickView		Open session QuickView, where you can review the event and dimensional data for every event that was triggered in the session. See "Searching Session Data" in the *IBM Tealeaf cxImpact User Manual*.
Session Info		View session properties. See "Searching Session Data" in the *IBM Tealeaf cxImpact User Manual*.
Send to Event Tester		Send the selected session to the Event Tester as sample data. See "Event Tester" in the *IBM Tealeaf Event Manager Manual*.

See "Searching Session Data" in the *IBM Tealeaf cxImpact User Manual*.

Replay of Mobile App Sessions through HTML representation

Using the HTML representation method to replay mobile app sessions, you can replay a mobile app session in Browser Based Replay as you would an HTML web session instead of viewing the mobile app session as a series of screen captures.

There are several advantages to using the HTML representation method to replay mobile app session over screen captures.

- Ability to mask private information
- Ability to draw user interactions (UI events) onto the HTML pages that are created from the JSON data
- Smaller data size

This method uses JSON data that is captured by the CX Mobile Logging Frameworks to create a collection of HTML pages, each with a collection of UI events within a JSON string. When the Replay Server finds a hit with a JSON string, the JSON Type 10 messages are converted into HTML through a template engine to render the collection of HTML pages that represent the mobile app screens. JSON Type 4 messages that follow a Type 10 message are filtered to produce associated UI Events that are visible in the Navigation List. This provides you with a deeper insight into your mobile app sessions.

The templates that are used by the template engine can be customized to meet your business needs. To configure your templates, contact IBM Tealeaf Professional Services or see "Native app session replay customization in the *IBM Tealeaf CX Configuration Manual.*

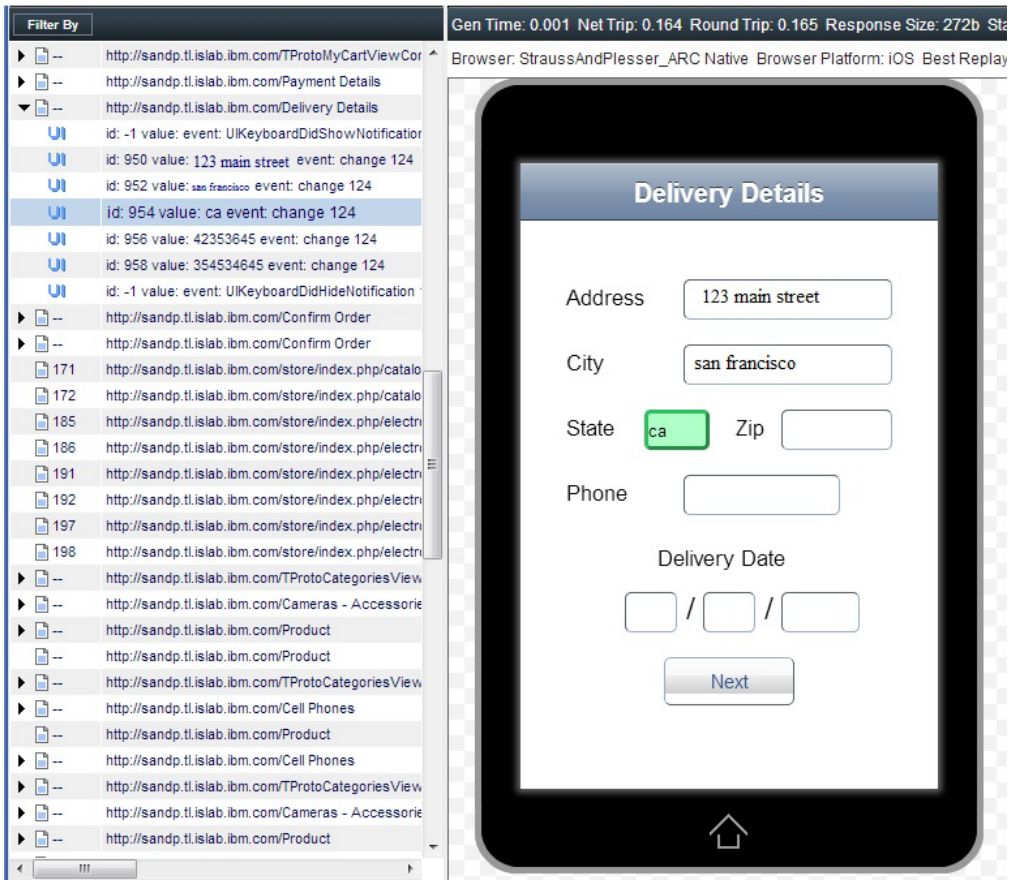
When you replay a mobile app session and use a Tealeaf Target page (the page where the mobile device POSTs JSON data) that does not match the naming convention of `TealeafTarget.*`, you may see native UI events that are associated to your unconventional Tealeaf Target pages when they belong to an earlier page.

In this case, to avoid this errant association, you can create an Ignore URL replay rule to filter your unconventional Tealeaf Target pages out of the Navigation List.

Replaying mobile app sessions through HTML representation requires configuration of the IBM Tealeaf Logging Framework.

- CX Mobile Android Logging Framework: See "Log Screen Layout for Android Mobile App Replay" in the *IBM Tealeaf CX Mobile Android Logging Framework Guide*.
- CX Mobile iOS Logging Framework: See "Log Screen Layout for iOS Mobile App Replay" in the *IBM Tealeaf CX Mobile iOS Logging Framework Guide*.

Note: If you replay a mobile app session with no CX UI Capture j2 data, the mobile skin might be large. The large mobile skin is because IBM Tealeaf did not receive any data from CX UI Capture j2. When there is no CX UI Capture j2 data, User Agent data is the fallback. The User Agent data might not be a correct or normalized properly.



Limitations

When replaying HTML representations of sessions that are generated from Android apps, there are often empty target pages in the **Navigation List**. During rendering, the target pages are converted to ScreenViews and UI Events. However, the original target pages remain in the **Navigation List** and appear as empty pages.

You can use the Ignore URLs rule to remove any of these original pages from the **Navigation List** that are not required.

To remove these original pages from the **Navigation List**, right-click the `target.php` page in the Navigation list, and click **Remove this page from Replay**.

The Ignore URLs rule does not work on sessions that are generated from iOS apps.

Replay of Mobile App Sessions through Screen Captures

You can replay sessions with mobile app screen captures in Browser Based Replay..

Screen capture requires configuration of the IBM Tealeaf Logging Framework.

- Android Logging Framework: See the *IBM Tealeaf Android Logging Framework Guide*.
- iOS Logging Framework: See the *IBM Tealeaf iOS Logging Framework Guide*.
- "Browser Based Replay Session Replay" on page 30

Limitations

As the visitor steps through different views of the native application, a screen capture can be captured and submitted to Tealeaf for display. During display of mobile native apps, static screen captures of each view are displayed.

- Screens are captured as soon as the view is initialized and before data is populated in any fields. It limits the exposure of sensitive data to Tealeaf.

  Note: For Android-based sessions, images that are captured from the web server are stored at the beginning of the session. Images that are captured from the local instance of the native application are stored in the appropriate locations throughout the session.

  Note: Mobile native application sessions are not replayed by using the mobile skin.

  Note: There is a known issue in which the PCA fails to properly recognize UTF-8 encoding in data that is submitted from client frameworks. The data can be mangled in the stored session, causing issues in eventing and search.

  Note: The following information applies to IBM Tealeaf version 9.0A only.

  9.0A can properly recognize UTF-8 encoding in data that is submitted from client frameworks.

User agent information

Note: If your client framework is not configured to report a user agent string in the `HTTP_USER_AGENT` request header, the extended user agent parsing information that can be displayed in BBR is reported as unknown in the toolbar at the top of replay view. The user agent string must match a user string in the public standards that was deployed into your Tealeaf solution.

- Capture of user agent information requires more configuration. For more information about user agent detection, see "Managing User Agents" in the *IBM Tealeaf cxImpact Administration Manual*.

Browser-specific features in BBR replay

Note: To render sessions captured from mobile devices for display in the web browser, the Tealeaf Replay Server utilizes an embedded renderer that is based on

the Chromium engine. For best results in replay of mobile-based sessions, Tealeaf recommends using the Chrome browser in Browser-Based Replay.

Sessions that are requested by a BBR user are passed by the Replay Server to a renderer that is appropriate for the source of the session. For example, Firefox sessions are passed to the Gecko renderer, while Chrome/WebKit sessions are passed to the Chrome renderer.

- The Chrome renderer must be enabled. See "Configuring the Replay Server" in the *IBM Tealeaf CX Configuration Manual*.

Note: Browser-specific styling cannot be appropriately applied to sessions that are delivered to a different type of browser. For example, WebKit-specific styles cannot be applied to a session that is rendered for and delivered to a Firefox browser.

Screen Dimensions for Mobile Devices

If the IBM Tealeaf CX Mobile license and extended user agent parsing is enabled, captured images are displayed in the screen dimensions that are used on the mobile device. This is the same device from which the native application session was captured.

Note: For mobile native application sessions, display of images is determined by the Logging Framework, which always screen capture the currently configured resolution for the device. The dimensions cannot be configured in BBR for mobile native application sessions.

- For the Android logging framework, the screen capture's dimensions are represented in the left navigation bar, and the image is resized in BBR. If the Android device has a width or height less than 320 pixels, the image is not scaled.
- For more information about extended user agent parsing, see "Managing User Agents" in the *IBM Tealeaf cxImpact Administration Manual*.

Browser Based Replay Session Replay

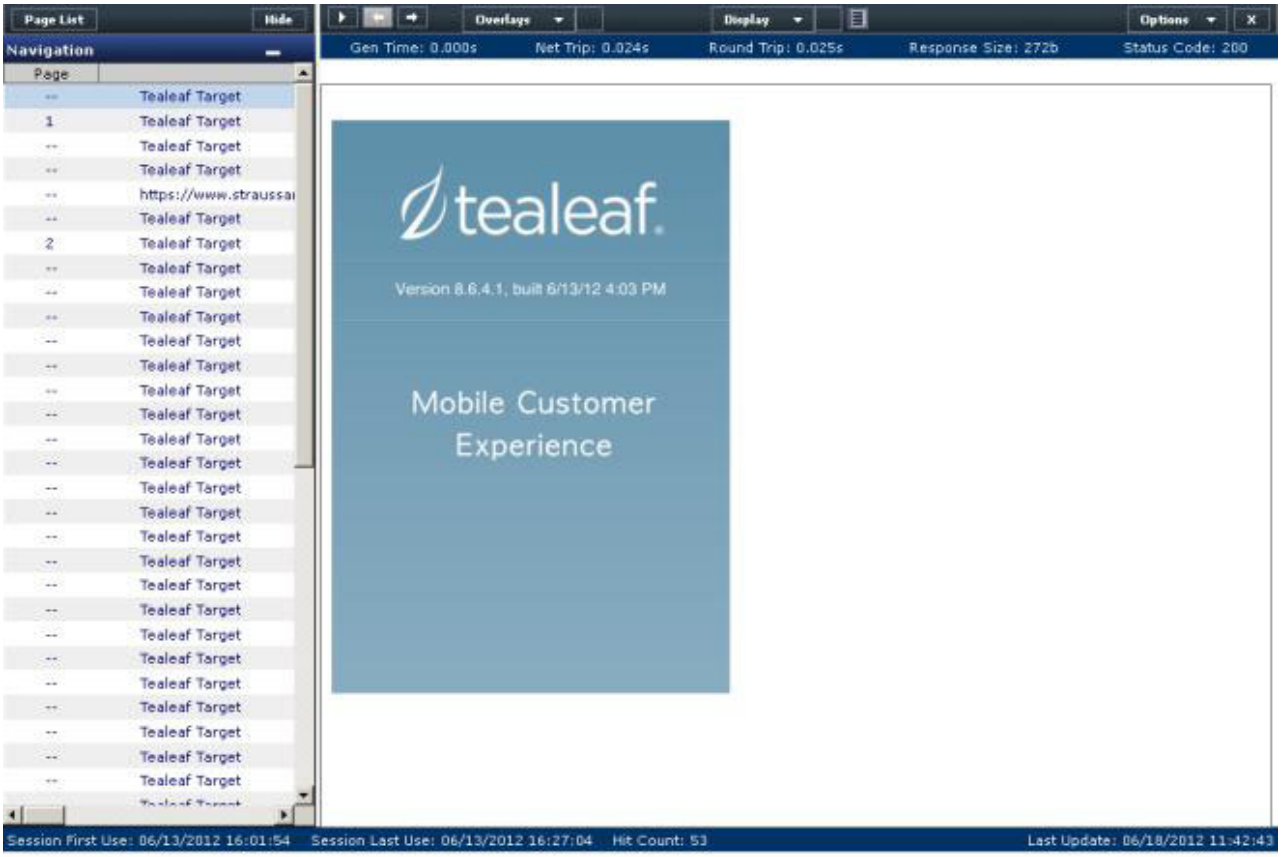


Figure 6. Mobile Native Application - BBR Session Replay

In BBR, you can review screen images by selecting the appropriate items in the Navigation List. These entries signify that a new view is loaded but not populated with data yet.

- In the Navigable Pages List, mobile native application views and user interface changes are not numbered.

  Note: If your mobile native application enables web-based interactions with a web server that is monitored by Tealeaf, these web interactions are transmitted as soon as they occur. Since mobile native application interactions are batched and submitted periodically, they are timestamped by the PCA after web interactions, which are submitted in real time. During replay, the web interactions can be listed and displayed before the mobile native application interactions that occurred beforehand. This issue is addressed in a later build.

Depending on how data is captured by the Logging Framework and client application, user data can be available in the Navigable List entries between the screen capture entries.

For more information on Browser Based Replay, see "CX Browser Based Replay" in the *IBM Tealeaf cxImpact User Manual*.

Browser Based Replay configuration

For best results in displaying sessions through Browser-Based Replay, IBM Tealeaf recommends the following configuration settings in Browser Based Replay:

- Options not referenced here can be specified based on your Tealeaf environment.

Table 4. BBR configuration

Setting	Value	Notes®
View > **User Agent Info**	Do not select.	By default, user agent information is not populated for mobile native applications. See "Tealeaf Reference Session Agent" in the *IBM Tealeaf CX Configuration Manual*.
Options > **Page Numbering** > **Use Hit Numbers**	Select.	When the list of pages is displayed by hit number, then items are numbered in the following format: `<Letter><Index>` where: • `<Letter>` corresponds to an alphabetical letter, each of which identifies a different session fragment. • `<Index>` corresponds to the index of views within an ScreenView.
Options > **Page Naming** > **Use Page Title**	Select.	When selected, you can easily see which pages are marked as `Tealeaf Target`. Some of these pages identify the screen captures to review. • When deselected, pages are displayed by URL, which may require you to widen or scroll the Navigable Page List to review.
Options > **Advanced** > **Merge Session Fragments**	Do not select.	Since mobile native applications are sessionized in a different manner, this option does not work for mobile native application display.
Options > **Advanced** > **Report Javascript Errors**	Do not select.	Does not apply.
Options > **Resize View to Match Session**	Do not select.	Replay pane is auto-resized to the size of the screen capture provided by the Logging Framework. This setting requires user agent information to apply. See “User agent information” on page 28.

See "CX Browser Based Replay" in the *IBM Tealeaf cxImpact User Manual*.

See "BBR Options" in the *IBM Tealeaf cxImpact User Manual*.

Chapter 4. Events for Mobile Visitors

Through WURFL reference data, Tealeaf can be configured to identify mobile visitors that are based on data that is stored in the request by Tealeaf. You can learn how to configure Tealeaf to detect mobile visitors and to generate events to detect them.

Enabling Extended User Agent Detection

Before you begin, you must enable extended user agent detection in the IBM Tealeaf CX platform.

- See "Configuring User Agent Detection" in the *IBM Tealeaf cxImpact Administration Manual*.

Acquiring Tealeaf CX Mobile Events through the CX Mobile Dashboard

The IBM Tealeaf CX Mobile module includes a suite of events for mobile visitors. These events can be imported with the Mobile Traffic Dashboard, which must be imported into your Tealeaf solution.

How Mobile Visitors Are Detected

When extended user agent detection is enabled, the data relevant to mobile devices is captured and inserted into the `[ExtendedUserAgent]` section of request by the Tealeaf Reference session agent.

The Tealeaf Reference session agent must be enabled in your Tealeaf processing pipeline.

- See "Tealeaf Reference Session Agent" in the *IBM Tealeaf CX Configuration Manual*.
- See "TMS Pipeline Editor" in the *IBM Tealeaf cxImpact Administration Manual*.

Information inserted into the request

When the Tealeaf Reference session agent detects a mobile session, the WURFL standard is checked and any available information is inserted into the request. For example, the following is an example of the `[ExtendedUserAgent]` section of request:

```
[ExtendedUserAgent]
TLT_BROWSER=Openwave Mobile Browser
TLT_BROWSER_VERSION=Openwave Mobile Browser6.2
TLT_BROWSER_PLATFORM=
TLT_TRAFFIC_TYPE=MOBILE
TLT_BROWSER_JAVASCRIPT=false
TLT_BROWSER_COOKIES=true
TLT_BRAND=LG
TLT_MODEL=LG MX510
TLT_SCREEN_HEIGHT=220
TLT_SCREEN_WIDTH=176
TLT_COLOR_DEPTH=65536
TLT_PICTURE_SUPPORT=true
TLT_VIDEO_SUPPORT=false
TLT_STREAMING_SUPPORT=false
```

© Copyright IBM Corp. 1999, 2014

Identifying mobile web browsers

Self-reporting mobile browsers are identified in the Tealeaf Canister that are based on the following value in the [ExtendedUserAgent] variable.

```
TLT_TRAFFIC_TYPE=MOBILE
```

When this value is set to MOBILE, the user agent is a mobile device. This value is used to populate the provided session attribute Browser Traffic Type, which contains the value MOBILE for these self-reporting mobile browsers.

This session attribute can then be referenced in your event definitions.

Identifying mobile web applications

If you have license for one of the following client frameworks, you can use the Traffic Type dimension to identify following sessions that were captured:

- *IBM Tealeaf Android Logging Framework Guide*
- *IBM Tealeaf iOS Logging Framework Guide*

These client frameworks submit user agent information for capture by Tealeaf. The Tealeaf Reference session agent interprets the user agent information and populates the [ExtendedUserAgent] section, including the TLT_TRAFFIC_TYPE variable:

```
TLT_TRAFFIC_TYPE=MOBILE_APP
```

When this value is set to MOBILE_APP, the user agent is a mobile native application.

This value is displayed in the Traffic Type dimension. See "Traffic Type dimension" on page 35.

Request variable reference

Below, you can review the definitions for each of these request variables.

Request Variable Name
Description

TLT_BROWSER
Browser type for the mobile device

TLT_BROWSER_VERSION
The version of browsers for the mobile device

TLT_BROWSER_PLATFORM
The operating system in use, if the device is a mobile one.

TLT_TRAFFIC_TYPE
The type of traffic for the device. Self-reporting mobile devices have this value that is set to MOBILE.

TLT_BROWSER_JAVASCRIPT
Does the device accept and run JavaScript? Possible values: True, False, or Unknown, which means that the data is not present.

TLT_BROWSER_COOKIES
Does the device accept cookies? Possible values: True, False, or Unknown, which means that the data is not present.

TLT_BRAND
The brand of the mobile device

TLT_MODEL
The model name for the mobile device

TLT_SCREEN_HEIGHT
Height of the screen in the mobile device.

TLT_SCREEN_WIDTH
Width of the screen in the mobile device.

TLT_COLOR_DEPTH
Number of colors that the device can display

TLT_PICTURE_SUPPORT
Does the device support display of picture formats? Possible values: `True`, `False`, or `Unknown`, which means that the data is not present.

TLT_VIDEO_SUPPORT
Does the device support download of video? Possible values: `True`, `False`, or `Unknown`, which means that the data is not present.

TLT_STREAMING_SUPPORT
Does the device support video streaming? Possible values: `True`, `False`, or `Unknown`, which means that the data is not present.

Mobile Events

You can learn about various types of mobile events in this section.

Browser Traffic Type Event

Through the Tealeaf Event Manager, you can define events that apply to mobile browser-based sessions only.

By including the following condition in your event definition, the event is triggered only for mobile browser sessions:

Figure 7. Session attribute Browser Traffic Type as event condition

In the previous event, the initial condition is set to test for the **Browser Traffic Type** session agent which is equal to **MOBILE**. Since the event is testing for all conditions to be true for the event to fire, you can add other conditions to the event to create events that apply to mobile-only sessions.

Note: For each event that you create for mobile browsers, you must add the session agent as a test condition to restrict the test to only mobile-sourced sessions.

For more information about editing events, see "TEM Events Tab" in the *IBM Tealeaf Event Manager Manual*.

Traffic Type dimension

Similarly, you can use the provided `Traffic Type` dimension to filter your reports to display only information from sessions that are sourced from self-reporting mobile browsers.

When the `Traffic Type` dimension is added to the report, you can filter the dimension to display one of the following values to report on events and ratios for mobile web or mobile native application sessions.

Traffic Type Dimension Value
Description

`MOBILE` Session was initiated from a mobile web browser and was captured by IBM Tealeaf CX UI Capture j2.

- See "Integrating Client Framework Data into Tealeaf" in the *IBM Tealeaf Client Framework Data Integration Guide*.

`MOBILE_APP`
Session was initiated from a mobile native application and was captured by a Tealeaf client framework.

- See "Integrating Client Framework Data into Tealeaf" in the *IBM Tealeaf Client Framework Data Integration Guide*.

For more information about creating reports with the `Traffic Type` dimension, see "Tealeaf Report Builder" in the *IBM Tealeaf Reporting Guide*.

The `Traffic Type` dimension is sourced from the same information on the request as the `Browser Traffic Type` session attribute.

- See "TEM Dimensions Tab" in the *IBM Tealeaf Event Manager Manual*.

Creating Other Mobile Events

You can create other events that are based on the mobile data for the device, as extracted from the WURFL standard. Since this information is stored in the request record, you can create a hit attribute to look for values for each of the request variables listed. Then, you can create events or dimensions that use these hit attributes as source data.

The basic approach is as follows.

1. Create hit attribute:
   a. In the Portal, select **Configure** > **Event Manager**.
   b. Click the **Hit Attributes** tab. See "TEM Hit Attributes Tab" in the *IBM Tealeaf Event Manager Manual*.
   c. Click **New Hit Attribute**.
   d. Specify the hit attribute properties:
      1) You can name it similar to the request variable for easy identification.
      2) Search in: `Request`
      3) Use Start Tag/End Tag: selected
      4) Start Tag: Use the following request variable and an equal sign as in the :
         `TLT_TRAFFIC_TYPE=`
      5) End Tag: Use the following string:
         `\r\n`
   e. Click **Save Draft**.
   f. Click **Save Changes**.
2. Create event:
   a. In the Portal, select **Configure** > **Event Manager**.

b. Click the **Events** tab. See "TEM Events Tab" in the *IBM Tealeaf Event Manager Manual*.
c. Click **New Event**.
d. Specify the hit attribute properties:
    1) You can name it similar to the request variable for easy identification.
    2) For the Condition, click the Hit Attributes panel. Select the hit attribute that you just created. Specify the conditions as needed for the event.
    3) For the Value, click the Hit Attributes panel. Select the hit attribute that you just created. You specify that the event is configured to record the value of the hit attribute.
    4) Make other configuration changes as needed.
e. Click **Save Draft**.
f. Click **Save Changes**.

3. Repeat the previous steps for any of the mobile hit attributes that you like to capture in events.

Dimension Value Lists

To support the set of lists, you can enable logging on the dimensions you create to gather data. This data can then be downloaded through the Event Manager to your local system, where you can normalize the data and add or remove values. This list of values can then be reloaded into the dimension as a whitelist.

- For more information about generating these lists, see "User Agent Tools" in the *IBM Tealeaf cxImpact Administration Manual*

Reporting on Mobile Events

When the previous events are enabled, instances of event data can be counted, or the data values can be broken out for reporting. Through the Tealeaf Portal, you can create analysis of events. Through the Tealeaf Portal, select **Analyze** > **Report Builder**. The list of available menu options are displayed.

For more information about individual reports for IBM Tealeaf CX Mobile, see Chapter 5, “Reporting for Mobile Web,” on page 39.

Chapter 5. Reporting for Mobile Web

The ability to filter analysis based on the type of device allows Tealeaf users to generate reports on mobile devices. These mobile devices are used to access the monitored web application.

Note: This section applies to sessions initiated through mobile web browsers to your web application.

For example, suppose that you are able to identify mobile users by device type. Through Tealeaf reporting, you discover that mobile users are predominantly creating one-page sessions, meaning that they visit a single page on your website before leave. Which pages are hit the most by mobile visitors in one-page sessions: login, status update, or other?

- If mobile visitors are only hitting the login page, perhaps there are functional problems with the page that are preventing mobile users from accessing the site.
- If visitors are hitting a status update page, then content to that page can be tailored for maximal effect for mobile users with more links to useful pages deeper in the site.

Tealeaf CX Mobile Dashboard

The IBM Tealeaf CX Mobile module includes the Mobile Traffic Dashboard, which must be imported into your Tealeaf solution.

Building Your Own Reports

Based upon the reference data for mobile devices and the events that are created to monitor them, you can create event-based reports to identify mobile activities.

In the Tealeaf Report Builder, you can create reports that are filtered by the `Traffic Type` dimension, which can be used to identify sessions that are initiated from a mobile browsing device.

Traffic Type Dimension Value
Description

`MOBILE` Session was initiated from a mobile web browser and was captured by IBM Tealeaf CX UI Capture for AJAX.

Note: IBM Tealeaf CX UI Capture for AJAX is only available to legacy users.

- See "Integrating Client Framework Data into Tealeaf" in the *IBM Tealeaf Client Framework Data Integration Guide*.

`MOBILE_APP`
Session was initiated from a mobile native application and was captured by a Tealeaf client framework.

- See "Integrating Client Framework Data into Tealeaf" in the *IBM Tealeaf Client Framework Data Integration Guide*.

For more information about creating reports with the `Traffic Type` dimension, see "Tealeaf Report Builder" in the *IBM Tealeaf Reporting Guide*.

© Copyright IBM Corp. 1999, 2014

These reports can then be integrated as components in custom dashboards.

- See "Configuring Dashboards" in the *IBM Tealeaf cxView User Manual*.

Chapter 6. Reporting for Mobile App

The IBM Tealeaf CX Mobile for Mobile App logging frameworks enable the capture of a large array of device properties and user interface events into Tealeaf, where these values can be made available for reporting. Using data sourced from the Tealeaf Logging Frameworks, you can create event objects, such as hit attributes, dimensions, and events, to capture this data for reporting purposes. When the objects are created, you can use them in the same reports that are described at the end of section. You can also use them in reports that are already created.

Note: Use of the Tealeaf Logging Frameworks for mobile native applications requires the Tealeaf CX Mobile license for Mobile App. For more information, please contact your Tealeaf representative.
Licensees must implement in their apps code that is provided by Tealeaf. For more information on downloading Tealeaf software, see Tealeaf CX Downloads.

Pre-requisites

Note: IBM Tealeaf CX Mobile for Mobile App uses one or more Tealeaf Logging Frameworks, which must be deployed and configured with the mobile native applications deployed to your visitors.

- See the *IBM Tealeaf iOS Logging Framework Guide*.
- See the *IBM Tealeaf Android Logging Framework Guide*.

Two data transmission methods

The Tealeaf Logging Frameworks support two methods of submitting data and capturing it in Tealeaf:

Table 5. Two data transmission methods

Method	Supported Releases	Description
Hit-splitting	Release 8.4	If you implemented a Tealeaf logging framework to interact with your Release 8.4 system, you must deploy a session agent in your Windows pipeline. This session agent splits captured messages into individual hits, which are inserted into the regular session data. **Note:** This legacy method of processing client framework is supported in the current release. In a future release, it is likely to be deprecated. The remainder of this section describes the current method of processing. • For more information on this session agent, see "JSON Mobile Parser Session Agent" in the *IBM Tealeaf CX Configuration Manual*.
Step-based eventing	Release 8.5 and later	The logging frameworks submit messages using a unified JSON format. These messages are inserted into the request, from which you can create attributes and events. • For more information on step-based eventing, see "Step-Based Eventing" in the *IBM Tealeaf Event Manager Manual*.

© Copyright IBM Corp. 1999, 2014

Configuring Event Objects

Tealeaf provides a set of step attributes and events to support the tracking of user interface events that are captured through a Tealeaf client framework. These objects can be used as the basis for building other event objects for tracking the specifics of your client application.

For more information about the provided event objects and other objects of value to create, see "Integrating Client Framework Data into Tealeaf" in the *IBM Tealeaf Client Framework Data Integration Guide*.

Investigating the Data

After you create event objects for your mobile native application data, you can use the Portal-based tools to investigate it. This section provides high-level information about how to use the Portal to explore data that is captured from your mobile native application.

Creating Reports

When attributes, events, and dimensions are created to track mobile native application events and data, you can begin building reports or by using the objects in reports that you already created in the Tealeaf Report Builder.

Note: For tracking purposes, dimensions, such as the `Mobile Device` dimension, must be associated with events before dimensional data can be recorded for the events. By default, this dimension is associated with some Tealeaf Standard Events. Before you track event activities by mobile device type, this dimension must be associated with those events first, and event instances must be detected and recorded. See "TEM Events Tab" in the *IBM Tealeaf Event Manager Manual*.

For more information about creating reports, see "Tealeaf Report Builder" in the *IBM Tealeaf Reporting Guide*.

Tracking Variations

For events captured from mobile native applications, you may wish to track variations in reported values. For example, you want to identify changes in reported hit counts for the mobile native applications, which may signal disinterest with the application.

Through the Event Manager, you can create Top Movers to track variations in reported values for specific events or dimensions. These Top Movers can be configured to be calculated on hourly or daily intervals.

- For more information about creating Top Movers, see "TEM Top Movers Tab" in the *IBM Tealeaf Event Manager Manual*.

When Top Movers are created and capturing data, you can create and review reports on Top Movers through the Portal. These easy-to-use reports provide a basic mechanism for tracking variations in captured values on key metrics that are related to application health. You can display multiple Top Movers of your mobile native application data to monitor basic changes in customer interactions with it.

Note: Some components of Top Movers reporting are available with the IBM Tealeaf cxView license. See "Enhancements to Top Movers for cxView" in the *IBM Tealeaf cxView User Manual*.

For more information about creating Top Movers reports, see "Analyzing Top Movers" in the *IBM Tealeaf Reporting Guide*.

Search

You can learn about search options in reports and portal in this section.

Drill-down

From either Top Mover or Report Builder reports, you can drill into the report to explore individual sessions.

- From the Top Mover report, available links in the data table open the Tealeaf Report Builder with a report on the underlying event or dimension that is displayed by using the appropriate date range.
- From a Report Builder report, you can use the links in the data table to open a session list. It contains the sessions that are supporting the data reported in the link you clicked.

From the session list, you can explore individual sessions, including locating the exact hit where the event or dimension was recorded.

- See "Searching Session Data" in the *IBM Tealeaf cxImpact User Manual*.

Portal search

You can also search sessions that are containing individual events or event + dimension combinations through the Portal.

- See "Searching Session Data" in the *IBM Tealeaf cxImpact User Manual*.
- See "Searching Session Data" in the *IBM Tealeaf cxImpact User Manual*.

Available Dashboards

Tealeaf provides report templates and dashboards that you can download and install in your Tealeaf solution.

Chapter 7. IBM Tealeaf documentation and help

IBM Tealeaf provides documentation and help for users, developers, and administrators.

Viewing product documentation

All IBM Tealeaf product documentation is available at the following website:

https://tealeaf.support.ibmcloud.com/

Use the information in the following table to view the product documentation for IBM Tealeaf:

Table 6. Getting help

To view...	**Do this...**
Product documentation	On the IBM Tealeaf portal, go to **?** > **Product Documentation**.
Help for a page on the IBM Tealeaf Portal	On the IBM Tealeaf portal, go to **?** > **Help for This Page**.

Available documents for IBM Tealeaf products

Use the following table to view a list of available documents for all IBM Tealeaf products:

Table 7. Available documentation for IBM Tealeaf products

IBM Tealeaf products	**Available documents**
IBM Tealeaf CX	• *IBM Tealeaf Customer Experience Overview Guide* • *IBM Tealeaf CX Client Framework Data Integration Guide* • *IBM Tealeaf CX Configuration Manual* • *IBM Tealeaf CX Cookie Injector Manual* • *IBM Tealeaf CX Databases Guide* • *IBM Tealeaf CX Event Manager Manual* • *IBM Tealeaf CX Glossary* • *IBM Tealeaf CX Installation Manual* • *IBM Tealeaf CX PCA Manual* • *IBM Tealeaf CX PCA Release Notes*

© Copyright IBM Corp. 1999, 2014

Table 7. Available documentation for IBM Tealeaf products (continued)

IBM Tealeaf products	Available documents
IBM Tealeaf CX	• *IBM Tealeaf CX RealiTea Viewer Client Side Capture Manual* • *IBM Tealeaf CX RealiTea Viewer User Manual* • *IBM Tealeaf CX Release Notes* • *IBM Tealeaf CX Release Upgrade Manual* • *IBM Tealeaf CX Support Troubleshooting FAQ* • *IBM Tealeaf CX Troubleshooting Guide* • *IBM Tealeaf CX UI Capture j2 Guide* • *IBM Tealeaf CX UI Capture j2 Release Notes*
IBM Tealeaf cxImpact	• *IBM Tealeaf cxImpact Administration Manual* • *IBM Tealeaf cxImpact User Manual* • *IBM Tealeaf cxImpact Reporting Guide*
IBM Tealeaf cxConnect	• *IBM Tealeaf cxConnect for Data Analysis Administration Manual* • *IBM Tealeaf cxConnect for Voice of Customer Administration Manual* • *IBM Tealeaf cxConnect for Web Analytics Administration Manual*
IBM Tealeaf cxOverstat	*IBM Tealeaf cxOverstat User Manual*
IBM Tealeaf cxReveal	• *IBM Tealeaf cxReveal Administration Manual* • *IBM Tealeaf cxReveal API Guide* • *IBM Tealeaf cxReveal User Manual*
IBM Tealeaf cxVerify	*IBM Tealeaf cxVerify Administration Manual*
IBM Tealeaf cxView	*IBM Tealeaf cxView User Manual*
IBM Tealeaf CX Mobile	• *IBM Tealeaf CX Mobile Android Logging Framework Guide* • *IBM Tealeaf Android Logging Framework Release Notes* • *IBM Tealeaf CX Mobile Administration Manual* • *IBM Tealeaf CX Mobile User Manual* • *IBM Tealeaf CX Mobile iOS Logging Framework Guide* • *IBM Tealeaf iOS Logging Framework Release Notes*

Notices

This information was developed for products and services offered in the U.S.A.

IBM® may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

Intellectual Property Licensing
Legal and Intellectual Property Law
IBM Japan, Ltd.
19-21, Nihonbashi-Hakozakicho, Chuo-ku
Tokyo 103-8510, Japan

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

© Copyright IBM Corp. 1999, 2014

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Bay Area Lab
1001 E Hillsdale Boulevard
Foster City, California 94404
U.S.A.

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement or any equivalent agreement between us.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

All statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs. The sample

programs are provided "AS IS", without warranty of any kind. IBM shall not be liable for any damages arising out of your use of the sample programs.

Trademarks

IBM, the IBM logo, and ibm.com® are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at “Copyright and trademark information” at www.ibm.com/legal/copytrade.shtml.

Privacy Policy Considerations

IBM Software products, including software as a service solutions, ("Software Offerings") may use cookies or other technologies to collect product usage information, to help improve the end user experience, to tailor interactions with the end user or for other purposes. A cookie is a piece of data that a web site can send to your browser, which may then be stored on your computer as a tag that identifies your computer. In many cases, no personal information is collected by these cookies. If a Software Offering you are using enables you to collect personal information through cookies and similar technologies, we inform you about the specifics below.

Depending upon the configurations deployed, this Software Offering may use session and persistent cookies that collect each user's user name, and other personal information for purposes of session management, enhanced user usability, or other usage tracking or functional purposes. These cookies can be disabled, but disabling them will also eliminate the functionality they enable.

Various jurisdictions regulate the collection of personal information through cookies and similar technologies. If the configurations deployed for this Software Offering provide you as customer the ability to collect personal information from end users via cookies and other technologies, you should seek your own legal advice about any laws applicable to such data collection, including any requirements for providing notice and consent where appropriate.

IBM requires that Clients (1) provide a clear and conspicuous link to Customer's website terms of use (e.g. privacy policy) which includes a link to IBM's and Client's data collection and use practices, (2) notify that cookies and clear gifs/web beacons are being placed on the visitor's computer by IBM on the Client's behalf along with an explanation of the purpose of such technology, and (3) to the extent required by law, obtain consent from website visitors prior to the placement of cookies and clear gifs/web beacons placed by Client or IBM on Client's behalf on website visitor's devices

For more information about the use of various technologies, including cookies, for these purposes, See IBM's Online Privacy Statement at: http://www.ibm.com/privacy/details/us/en section entitled "Cookies, Web Beacons and Other Technologies."

Printed in USA